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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,388	07/17/2003	Hajime Ikuno	240441US0	9623

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EXAMINER	
MORILLO, JANELL COMBS	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/620,388	IKUNO ET AL.	
	Examiner	Art Unit	
	Janelle Combs-Morillo	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *7-14 and 20-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,15-19 and 26-36* is/are rejected.

7)☒ Claim(s) *37 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 15-19, 26-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US 4,434,014) in view of "ASM Casting" p 743-760 and/or "Aluminum Standards and data 2003" p 1-6.

Smith teaches a high strength and wear resistant aluminum alloy suitable for components in engines, including pistons (abstract). Said alloy comprises (in wt%): 12-15% Si, 1.5-5.5% Cu, 1-3% Ni, preferably 0.1-0.5% Fe, 0.01-0.1% Ti, 0.1-1% Mg, 0.01-0.1% Zr, 0.1-0.8% Mn, which overlaps or touches the boundary of the presently claimed ranges of Si, Cu, Ni, Fe, Mg, Zr, and Mn (cl. 1-3, 15-17, 26-28). Smith teaches 0.001-0.1% of a modifier is present, but does not specify P (cl. 1, 15, 26, 31) or Ca (cl. 4, 18, 29, 34). Smith does not teach a minimum of 0.15% Ti is present.

Concerning the amended Ti minimum of 0.15%, "ASM Casting" p 746 teaches that excessive Ti is used for casting alloys in order to reduce cracking tendencies (p 746 at 2nd column). Similar 3xx series type aluminum alloys typically contain up to 0.25% Ti (see Table 1). It would have been obvious to one of ordinary skill in the art to include up to 0.25% Ti for the Al-Si-Cu casting alloy taught by Smith, because "ASM Casting" teaches excessive (beyond the

amount normally used for grain control) Ti is used for casting alloys in order to reduce cracking tendencies (p 746 at 2nd column).

However, "Aluminum Standards and data 2003" p 1-6 teaches Na, Sr, Ca, and/or P are added to 3xx and 4xx type Al-Si foundry alloys in order to modify the structure. "Aluminum Standards and data 2003" teaches 0.005-0.15% Ca and ≤ 0.060% P are effective modifiers. It would have been obvious to one of ordinary skill in the art to use Ca and P as modifiers for the Al-Si alloy taught by Smith, because Smith teaches that 0.001-0.1% of a modifier is present (Smith at cl. 1), and "Aluminum Standards and data 2003" teaches 0.005-0.15% Ca and ≤ 0.060% P are effective modifiers for 3xx series Al-Si alloys.

Alternatively, "ASM Casting" teaches that Ca (p 745, 752) and 0.0015-0.03%P (p 746, 753) are added to Al-Si alloys in order to refine/modify the Al-Si eutectic. "ASM Casting" does not mention the range of Ca preferred, but teaches a very low amount of modifier is needed to be effective, for instance, ≤ 0.05% (p 752). It would have been obvious to one of ordinary skill in the art to use Ca and P to modify the Al-Si alloy taught by Smith, because Smith teaches that 0.001-0.1% of a modifier is present, and because "ASM Casting" teaches that Ca and P are effective modifiers for Al-Si alloys.

Overlapping ranges have been held to be a prima facie case of obviousness, see MPEP § 2144.05. It would have been obvious to one of ordinary skill in the art to select any portion of the range, including the claimed range, from the broader range disclosed in the prior art, because the prior art finds that said composition in the entire disclosed range has a suitable utility.

Concerning claims 5, 15, 35, which mention the "pre-use" Vickers hardness, Smith teaches said alloy has excellent strength and hardness (see BHN, Brinell Hardness, Table 3). The

examiner consulted a variety of handbooks and metallurgy texts, but was unable to locate a conversion scale from BHN to Vickers hardness. However, where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). Because the prior art teaches a substantially overlapping alloy composition, wherein said alloy is processed in a similar method of casting and heat treating (see examples of Smith), the properties applicant discloses and/or claims (such as Vickers hardness) are expected to be present. See MPEP 2112.01.

Concerning claims 6, 19, 30, 36, which mention "wherein size of non-metal inclusion existing within the piston is less than 100 μm", because the alloy taught by Smith substantially overlaps the presently claimed alloy composition (as well as being processed by s similar method of casting and heat treating), then substantially the same non-metal inclusions are expected to be present (see discussion above). Additionally, the examiner points out that said claims are not drawn to *all* inclusions, or *an average*, etc., but said limitation is met by one non-metal inclusion being ≤ 100 μm.

Response to Amendment/Arguments

3. In the response filed on November 2, 2005 applicant amended claims 1, 7, 15, and added new claims 26-38. The examiner agrees that no new matter has been added.

Applicant's argument that the present invention is allowable over the prior art of record because the prior art does not teach or suggest the addition of the presently claimed Ti range has

not been found persuasive. As stated above, it would have been obvious to one of ordinary skill in the art to include up to 0.25% Ti for the Al-Si-Cu casting alloy taught by Smith, because "ASM Casting" teaches excessive (beyond the amount normally used for grain control) Ti is used for casting alloys in order to reduce cracking tendencies (p 746 at 2nd column).

Allowable Subject Matter

4. Claims 37 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art does not teach or suggest an aluminum alloy piston with the presently claimed ranges of Si, Cu, Fe, Ni, P, Ti, Mg, complete with Mn, V, and Zr, substantially as claimed in instant claims 37 or 38.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 8:30 am- 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCM
January 12, 2006

GEORGE WYSZOMIERSKI
PRIMARY EXAMINER
GROUP 1700